

Development of a combined velocity and temperature measurement system for microfluidic-devices

There is an increased interest in micro fluidic systems or lab on a chip systems. These systems contain micro-channels filled with fluid, which can be used to investigate this fluid with short examination time and high efficiency, while only a small amount of fluid is needed.

Numerical packages exist to determine the flow field in a simplified model of the reality. Experiments are however necessary to determine the real flow field. To determine the real flow field, research has been done with different flow field measurement methods as micro PTV and holography. Using these methods, numerical results can be compared to the experimentally obtained results.

Besides visualization of the flow structure, temperature control is another important aspect in micro fluidic systems. Because temperature and flow field measurements are both important parameters in micro fluidic devices, a measurement method needs to be further developed in which velocity and temperature fields can be measured simultaneously and in three dimensions.

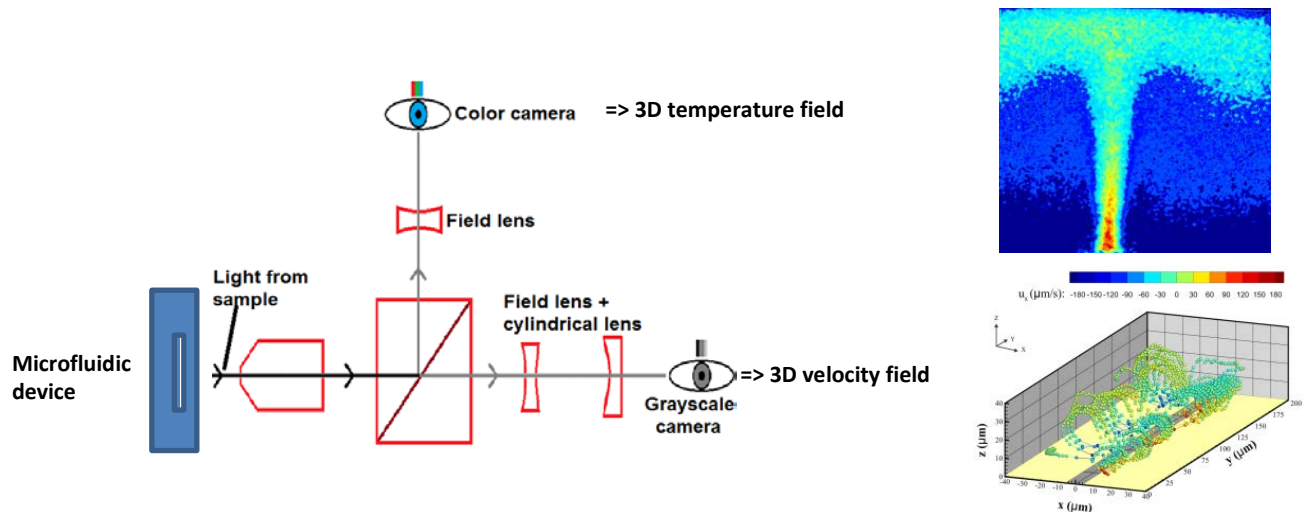


Figure 1. Schematic representation of the measurement set-up (left) and typical temperature and flow measurements (right)

Goal

The goal of this project is to further develop and optimize a combined velocity and temperature measurement system for micro-devices, to design a calibration and validation set-up and to compare and analyze the measured results with numerical simulations.

More information:

Arjan Frijns (GEM-Z 2.124, a.j.h.frijns@tue.nl)